

#### WHAT IS CLAIMED IS

1. An air shutter to be installed in front of a doorway where temperature difference exists between the inside and outside thereof in order to interrupt the flowage of air through the doorway, wherein the upper zone and lower zone of the opening area of the doorway are respectively defined as a hot air interception zone and cold air interception zone, between them existing a windless boundary, a hot air interception air stream is formed over said hot air interception zone and a cold air interception air stream is formed over said cold air interception zone, and both the air streams are formed by the circulation air circulating from one to the other interception air stream.

2. The air shutter according to claim 1, wherein said air shutter comprises a pair of gateposts of which each gatepost is provided at each side of the doorway, said cold air interception air stream is formed by the air spouted out from a cold air interception air stream generating part which comprises a nozzle and a fan or fans and provided in the lower part of one of said gateposts, said hot air interception air stream is formed by the air spouted out from a hot air interception air stream generating part which comprises a nozzle and a fan or fans and provided in the upper part of the other of said gateposts, and the opening area of the nozzle for forming the cold air interception air stream is larger than that of the nozzle for forming the hot air interception air stream

3. The air shutter according to claim 1, wherein said hot air interception air stream is formed such that it covers the opening area of the doorway over the region of height of  $0.1H \sim 0.4H$  ( $H$  is the height of the opening area of the doorway)

from the top of the area and said cold air intersection air stream is formed such that it covers the opening area of the door way over the region of height of  $0.5H \sim 0.9H$  from the floor.

4. The air shutter according to claim 1, wherein the air to form said hot air interception air stream is spouted out slanting inwardly by an angle of  $0 \sim 20^\circ$  and the air to form said cold air interception air stream is spouted out slanting outwardly by an angle of  $0 \sim 20^\circ$ .

5. The air shutter according to claim 2, wherein said cold air interception air stream generating part and hot air interception air stream generating part are provided in thermal insulation doors to open or close the doorway.

6. The air shutter according to claim 2, wherein said pair of gateposts is of a portal-shaped construction provided with an upper crossbeam connecting both gateposts, the development of a clearance, through which the inside of the doorway is communicated with the outside thereof, at the top of the doorway space when the doorway is opened being prevented with said upper crossbeam.

7. The air shutter according to claim 2, wherein a short curtain member is provided in the hot air interception zone in the upper part of the opening area of the door way to interrupt heat flow between the inside and outside of the opening area.

8. An air shutter to be installed in front of a doorway, where temperature difference exists between the inside and outside thereof and a door of vertically sliding type is provided, for interrupting the flowage of air through the doorway, wherein a portal-shaped construction which is composed of a pair of gateposts and an upper crossbeam connecting the gateposts;

the upper zone and lower zone of the opening area of the doorway are respectively defined as a hot air interception zone and cold air interception zone, between them existing a windless boundary; said hot air interception air stream is formed such that it covers the opening area of the door way over the region of height of  $0.1H \sim 0.4H$  ( $H$  is the height of the opening area of the doorway) from the top of the area and said cold air intersection air stream is formed such that it covers the opening area of the door way over the region of height  $0.5H \sim 0.9H$  from the floor, said cold air interception air stream being formed by the air spouted out from a nozzle provided in the lower part of one of said gateposts, said hot air interception air stream being formed by the air spouted out from a nozzle provided in the upper part of the other of said gateposts, the opening area of the nozzle for forming the cold air interception air stream being larger than that of the nozzle for forming the hot air interception air stream; and the air to form said hot air interception air stream is spouted out slanting inwardly by an angle of  $0 \sim 20^\circ$  and the air to form said cold air interception air stream is spouted out slanting outwardly by an angle of  $0 \sim 20^\circ$ .

9. An air shutter to be installed in front of a doorway where temperature difference exists between the inside and outside thereof in order to interrupt the flowage of air through the doorway to interrupt the flowage of air through the doorway, wherein a pair of gateposts is installed of which each gatepost is provided at each side of the doorway to oppose to each other, a duct for air passage being formed in each gatepost, each gatepost being provided with air spouting out openings and air sucking openings along the direction of height such that

each of the air spouting out openings of one side gatepost faces, or is opposite to, each of the air sucking openings of the other side gatepost respectively, a plurality of fans being provided behind each of said air spouting out openings; one of the gatepost is provided with the air spouting openings and fans located in the upper part and in the lower part thereof; the other of the gatepost is provided with the air spouting openings and fans located in the middle part in the direction of height thereof; and air is spouted out from the air spouting openings toward the corresponding opposite air sucking openings.

10. The air shutter according to claim 9, wherein the fans located in the middle part are divided into two groups, and each group of fans sucks air through each passage divided into two by a partition member for dividing the duct inside the other side gatepost.

11. An installation method of an air shutter to be installed in front of the doorway where pressure difference exists between the inside and outside thereof to interrupt the flowage of air through the doorway, in which the interruption is performed such that the upper zone and lower zone of the opening area of the doorway are respectively defined as a hot air interception zone and cold air interception zone, between them existing a windless boundary, a hot air interception air stream is formed over said hot air interception zone and a cold air interception air stream is formed over said cold air interception zone, both the air streams are formed by the circulation air circulating from the one to the other stream, said air shutter has gateposts, in each of which a suction duct and a fan or fans are provided, installed at each side

of the of said doorway, said cold air interception air stream being formed by the air spouted out from a nozzle provided in the lower part of one of said gatepost, said hot air interception air stream being formed by the air spouted out from a nozzle provided in the upper part of the other of said gatepost, the opening area of the nozzle for forming the cold air interception air stream being larger than that of the nozzle for forming the hot air interception air stream; wherein said air shutter is provided with seal elements to prevent air leakage from between the gateposts and doors.